• **focus on India**

Cardiology in India: State of the Art or Straight off the Heart?

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It was an intense academic debate. That is what the American College of Cardiology (ACC) wanted it to be. How to reduce door-to-balloon time in ST-segment elevation myocardial infarction (STEMI), the goal being 90 min, beyond which time myocardial salvage deteriorates. An active emergency medical service, in-ambulance electrocardiogram (ECG) and triage, and direct catheterization laboratory transfers are critical to achieving this. The National Cardiovascular Data Registry (NCDR) data showed that it is possible to achieve this, and it was so in 88% cases in the U.S. (1).

"Kapi ready, get up!" shouted my wife. Kapi, the local name of coffee in Kerala, has been an addiction here for generations. This southern-most state of India, "God's own country," is also the most literate state in India. Kerala has one of the best educational and health care standards in India, with 100% literacy and an infant mortality rate of 12 per 1,000 live births (Indian average of 53) (2). My wife's stern voice and the aroma of south Indian coffee woke me up, still groggy from the multiple phone calls that I had received last night about that heart failure patient in the intensive cardiac care unit (ICCU). As I grabbed the coffee, I lifted the telephone to call up to learn how the patient was. "He is better, sir," the resident told me, "but his relatives want him to be shifted home because they can't afford to keep him in the ICCU any more, now that it is 3 days. . . ." In this country, including this medically advanced, literate state, medical insurance is still just a vague new concept. With more than 90% of the patients without any health insurance, the patient's family has to bear the entire cost of the treatment, and to make payments now. I could understand the unusual request of the relatives.

"Are you not going to the hospital today? I am ready for school," screamed my 12-year-old son, whose basic talking decibel level borders normally almost on the ultrasound range.

The CREATE Registry study (3), published in *Lancet* in April 2008, collected data on acute coronary syndromes from 14 Indian states, towns, and metropolitan areas and 89 hospitals. It shows that in regard to STEMI, only 8% of patients in India receive primary angioplasty, and only 5% reach hospital by ambulance. "How did others come to the hospital, by walking?" asked my friend who works in Britain for the National Health Service. In fact, 42.5% reached hospitals by public transport such as buses.

"Will you see a patient in the casualty before you make rounds in ICCU? He is insistent that you see him, claims that you have treated many members of his family." Even in the congested morning mobile network, the irritation was clear in the casualty duty medical officer's tone. I could understand, taking care of road accidents and trauma, surgical emergencies, and orthopnea, he has reasons to be indignant.

The morning casualty was a horrific sight. All 22 beds were full, and patients were on trolleys, too. In the corner sat a 42-year-old man. "I had some stomach problem with lots of gas last night because I had taken some jackfruit. The gas even came to my lower jaw." He came a little closer to me and said in a hushed voice, "Today's doctors all want to do tests and not examine the patients. The moment I came, the doctor here asked me to have an ECG. I know it is only gas, so I said all tests after I see you." Angina with pain in the jaw. "ECG stat!" I barked. It showed extensive anterior wall myocardial infarction (MI). He was shifted to the ICCU. I know that family. They are fishermen by profession. They can't afford angioplasty or tpA. "Give him streptokinase," I ordered.

The Indian medical system is person-centric. Patients have faith in one doctor, not in a system. A patient with chest pain would prefer to wait for his

JACC Vol. 57, No. 3, 2011
January 18, 2011:377–9

trusted doctor to see him rather than rush to the casualty. A system once nurtured by doctors themselves, for commercial reasons.

The rounds in the ICCU go well. The 15-bed ICCU is decent, with an attached 24/7 catheterization laboratory and dedicated echo—all state of the art. Of the 6 STEMI patients in the ICCU, 2 are younger than 45 years of age. I am not surprised. Young STEMI patients often form 30% of the total STEMI population. Most young patients have either pre-diabetes (impaired fasting glucose and impaired glucose tolerance) or a dyslipidemia characterized by mildly elevated low-density lipoprotein, high triglyceride, and low high-density lipoprotein levels. Two decades ago, when I started my cardiology career, sons of STEMI patients would wait outside the ICCU to ask us how their father was doing after the heart attack. Today, the father anxiously waits to know how his son is doing after the MI. What a change of profile.

11 AM, and I am already late for the outpatient department (OPD). My junior residents present the history in each case, a large majority of which are routine follow-up after MI, and I advise the residents. Prescriptions are handed over, ECGs ordered, and echocardiograms scheduled—all the usual stuff. Every other cardiac patient is a diabetic. India has 40 million diabetics and still counting—estimated to reach 70 million by 2025.

The OPD nurse comes running after us as I teach my younger colleagues the guidelines and importance of antithrombotic therapy after lysis. "Today's OPD list is full at 60. At this pace, you are going to spend the whole day at the OPD," my OPD nurse tells me. She has been with me for a decade and knows my penchant for teaching. But she has to face the waiting patients' ire as everyone is delayed. I take her advice and proceed. The monotony of the OPD is punctuated by intermittent loud ring tones of mobile phones, blaring out the latest Hindi songs, followed by the apologetic exit of a patient bystander out of the room, clutching his mobile phone.

"A lady says she wants to see you but not for consultation. What to do?"

"Ask her to meet me in between 2 patients."

I recognize the lady. She had a bad MI, but is one of those lucky ones who could afford a primary percutaneous intervention (PCI). Her husband is a diabetic amputee. A young girl stood by her side. "Doctor, this is my daughter. She wants to become a doctor, and tomorrow is her medical entrance examination. I have brought her to get your blessings." The Indian blessing of touching the feet follows. Our new overseas observer, a British medical graduate, is intrigued and smiles. My OPD nurse looks at her watch.

1:30 PM. "Another 22 patients to go," the nurse reminds me, signaling me to be faster. The next patient, after her consultation was over, said, "Doctor, that is my son; he is working in the Technopark." Technology Parks are the IT hubs that have sprung up in many cities in India. The boys who work there are smart computer software engineers, paid well, but with very demanding schedules and targets. One look and they stand out. This boy was no different: obese, thick spectacles. "Doctor, I tell him not to overwork. He feels so weak. I am giving him some ayurvedic medicines, and now he is putting on weight. Nowadays, he tends to fall asleep even when he is watching TV." The alarm bell rings. I call up my nurse. "Get a TSH, cortisol, and also a sleep study to rule out obstructive sleep apnea." Later, the thyroid turns out to be normal, but his cortisol is abnormally low. The endocrinologist diagnoses exogenous steroid, probably from the ayurvedic medicine he was taking.

The Mayo Clinic review this year in the *Journal* by Tachjian et al. (4) clearly highlights the problems associated with the use of herbal drugs. In fact, many well-known remedies, such as garlic, ginseng, and so on, may have significant drug interactions. But in resource-poor India, alternative medicines are still popular. They are cheap and believed to be side-effect free, a stigma attached so strongly to "English medicine." I remember reading a paper in the *Lancet* a couple of years back that strongly advised physicians against "curbside consultation." But in India, even tea shops are curbside. If I had asked this man to come in for a routine consultation, it would have taken weeks, and the work-up even longer. Short cut!

Evening, and I reach home. My driver picks up my bag. The security guard salutes. The gardeners are leaving after mowing the lawns. Our housemaid is helping my wife organize the table. In India, you don't need to be a billionaire to afford these luxuries of life. A monthly income of 100,000 to 200,000 rupees (US$2,000 to $4,000) may be small by U.S. standards, but it gives you a comfortable life in India. Very few need to get malpractice insurance or medical indemnity, and even for those who go for it, it does not eat up a large part of their pay checks.

For patients, the cost of medical treatment is high by local Indian standards but low by American standards. For example, an ECG costs 100 rupees (US$2) and a full-color Doppler echo 1,000 rupees (US$20). But the VIVID 7 top-of-the-line echocardiogram machine (GE Healthcare, Milwaukee, Wisconsin) we buy carries the same price tag of US$100,000. So, the equipment has to work maybe 50 times more to get back the investment (US$1 = 45 Indian rupees), and the large patient throughput makes sure it does. The government health service is overburdened by a lack of professionals and an excessive patient load. Most services are free in government hospitals, except procedures such as angioplasty. Private health sectors are dominated by individually owned small and medium-sized hospitals. Huge corporate hospitals dot the skyline of large metro areas but, for obvious commercial reasons, have not made their presence in smaller towns. A coronary angiogram costs about 10,000 rupees (US$200) and a PCI with DES costs around 150,000 rupees (US$2,500) and upward.

My office consultation at home starts at 6:30 PM. Twenty patient appointments would take about 3 h. "How much does a patient pay as consultation fees?" asked one of my American colleagues. "Rupees 200 to 250 (US$5)," I answer. Unprintable response.

But in the end, it keeps you happy. Not the money you earn. Most Indian doctors are enormously respected by the society, perhaps far more than they actually deserve.

At the dinner following the ACC educational course, Dr. Anthony DeMaria (5) asked me to write an informal essay about the state of cardiology practice in India. With a 1.1 billion population, what kind of cardiology do we practice in India? State of the art or straight off the heart? Maybe neither. . .

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Key Words: cardiology ■ India ■ international cardiology.

doi:10.1016/j.jacc.2010.08.630